THE COMMONWEALTH MAP

Expansion of Kentucky's Statewide Digital Basemap

And

Participation in *The National Map*

A Report to the

Geographic Information Advisory Council

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By

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Introduction

The Commonwealth Map will be a twelve layer statewide digital basemap available free via the Internet for interactive mapping and geographic data querying and downloading. As a collaborative effort of local, state, and federal partners, this initiative is designed to facilitate public, non-profit, and private sector geographic information systems (GIS) development, utilization, innovation, and data sharing. ***The Commonwealth Map*** will serve as Kentucky's contribution to ***The National Map***.

Background

The 1994 Kentucky General Assembly created the Geographic Information Advisory Council—GIAC (KRS 11.515) and the Office of Geographic Information—OGI (KRS 42.650). The twenty-six member GIAC, representing state and local governments and professional organizations, advises the Chief Information Officer (CIO) and Governor's Office for Technology (GOT) in GIS issues. GIAC is responsible for GIS policy development, adoption of standards, encouragement of programs to minimize redundancy, and the promotion of statewide GIS activities (KRS 11.517). OGI is responsible for coordinating state and local government multiagency projects, including statewide base map creation and maintenance. OGI provides technical and policy assistance, offers consulting services and training, participates in research and pilot projects, and provides staff support to GIAC. OGI also serves as Kentucky's GIS liaison to the federal government.

In April, 1995, the GIAC Basemap Subcommittee of the Standards and Policies Committee, supported by OGI, issued a report entitled "A Strategy for the Creation of a Statewide Basemap for the Commonwealth of Kentucky." The Council endorsed this strategy. The basemap is composed of six layers: geodetic control, orthoimagery, elevation, hydrography, transportation, and administrative boundaries (***figure 1***). All six layers are now complete, or nearly complete. Appendix A provides a brief description and status report for each of these layers.

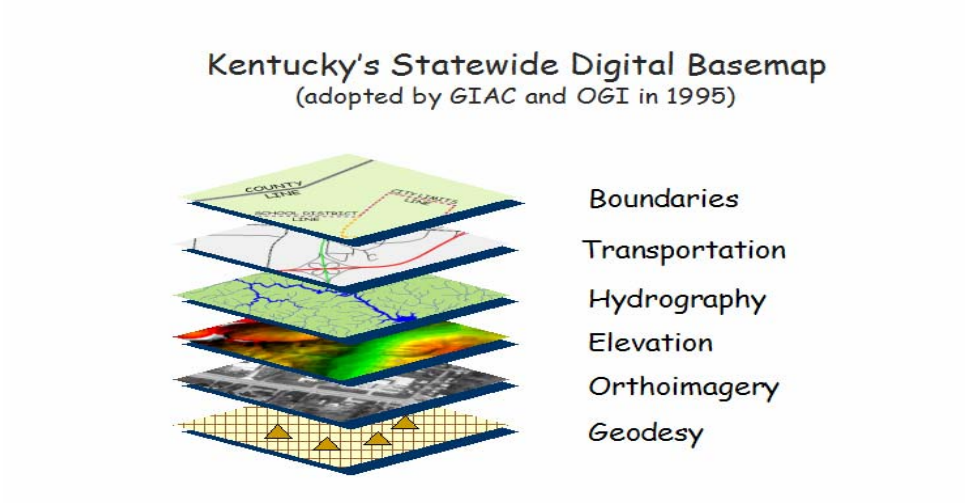

figure 1

The National Map

The U.S. Geological Survey (USGS), supported by other federal agencies, has initiated a program to replace the old 7.5 minute 1:24,000 scale topographic map quadrangle series with digital data. The following excerpts are from USGS Fact Sheet 018-02 (available, along with additional information on ***The National Map***, through the USGS home page at www.usgs.gov):

> *The U.S. Geological Survey (USGS) is committed to meeting the Nation's needs for current base geographic data and maps. Our vision is that, by working with partners, we will provide the Nation with access to current, accurate, and nationally consistent digital data and topographic maps derived from those data. This synthesis of information, products, and capabilities,* ***The National Map****, will be a seamless, continuously maintained set of geographic base information that will serve as a foundation for integrating, sharing, and using other data easily and consistently.*
>
> ***The National Map*** *will provide data about the United States and its territories that others can extend, enhance, and reference as they concentrate on maintaining other data that are unique to their needs.* ***The National Map*** *will promote cost effectiveness by minimizing the need to find, develop, integrate, and maintain geographic base data each time they are needed.*
>
> ***The National Map*** *will be accessible through the Internet all day, every day. The data will be in the public domain.*
>
> *The USGS will continue the tradition of the primary series topographic map by providing a standard set of paper topographic maps and digital data products derived from* ***The National Map****. Customers will be able to create their own maps by defining a geographic area of interest, selecting unique combinations*

of data, and printing their maps at home or at kiosks that will be available locally at libraries, recreational suppliers, bookstores, and so on.

The USGS will be the (1) guarantor of national data completeness, consistency, and accuracy; (2) organizer of component activities; (3) catalyst and collaborator for partnerships and business relationships; (4) integrator and certifier of data from all sources; (5) data producer and owner when no other source exists; and (6) leader in the development and implementation of national geospatial data standards.

The USGS will proactively seek partnerships and business arrangements with government agencies, the private sector, and other organizations to develop and operate ***The National Map****. USGS staff will be located across the Nation to work directly with staff of other USGS disciplines, partner organizations, private industry, and universities.*

The National Map currently has eight layers: orthoimagery, elevation, hydrography, transportation, boundaries, land cover, structures, and geographic names. Five of the six layers of Kentucky's Statewide Digital Basemap are included on this list.

Expansion of Kentucky's Basemap

The six additional layers to be added to Kentucky's basemap are land cover, parcels, structures, addresses, census, and geographic names (***figure 2***). These layers are described in Appendix B. The resulting twelve layer basemap will thus be fully compliant with ***The National Map***.

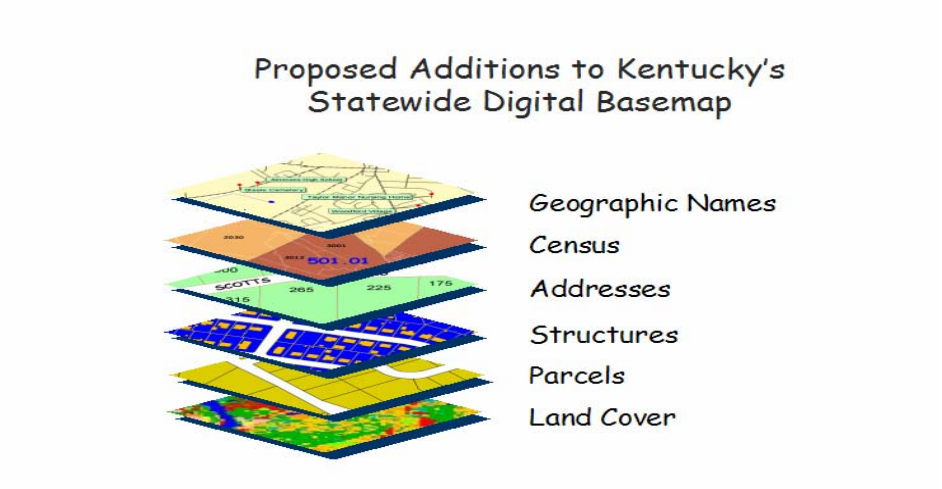

figure 2

Characteristics of Basemap Layers

In order to be considered as a candidate for the basemap a layer must have the potential for widespread use by a diversity of users. Base layers must also have statewide coverage—or statewide coverage must be attainable within a reasonable time frame.

A custodian must be willing to assume responsibility for the updating and maintenance of each layer. A custodian can be a single agency or custodianship can be shared by two or more agencies. Custodianship may be joint or established as primary and secondary. For some layers there may be a state government custodian and a number of regional or local government custodians.

The base layers must be available free to all users through the Internet for both web mapping and downloading of data. Some layers, however, will also serve as a gateway to more detailed databases maintained by their custodian agencies, but with restricted access due to security concerns or available only after the payment of a cost recovery fee.

Benefits of ***The Commonwealth Map***

In addition to supporting ***The National Map*** vision of a local-state-federal partnership effort, implementation of ***The Commonwealth Map*** will provide a unifying theme for Kentucky's GIS community and help to establish clearly defined goals and objectives. Kentucky will also gain recognition as a national GIS leader.

Cooperative programs within and between local, state, and federal governments will be encouraged and facilitated. Participation by agencies who are willing to share their data, time, and effort will be rewarded as they receive data from other participating agencies.

The web mapping component will demonstrate to every state agency and local government in Kentucky the benefits of GIS and allow them to do simple GIS maps. The availability through downloading of the twelve basemap layers, with its minimization of redundancy in data collection and maintenance, will make GIS program initiation more affordable and produce quicker results as agencies and local governments begin their own GIS programs.

The Commonwealth Map will support research and offer great opportunities for enhancing education curricula from grade school to university. It will enable agencies, business, and individuals to try new, and perhaps risky, applications with little or no investment other than time. Entrepreneurship will be encouraged. Business uses for GIS will be recognized and implemented--and economic development in Kentucky will be stimulated. Web mapping will also bring GIS down to the "citizen" level, both for individual uses such as outdoor recreation and for use by advocacy groups supporting or opposing various initiatives. Not all users will reach the same conclusions, but they will all have access to the same information.

Implementation Strategy

OGI is currently working with USGS to draft a Memorandum of Understanding (MOU) that will create a framework for " . . . the conduct of cooperative activities in areas of mutual interest in support of ***The National Map***." Activities to be covered by the MOU will include, but not be limited to, the following:

Data and database development
Data and database maintenance
Data dissemination and distribution
Exchange of geospatial and remotely sensed information, data, and products
Feature serving and generalization
Outreach and education
Research and applications
Sharing technical information and expertise
Standards development
Web mapping services and applications
Workshops, training, and technology transfer

The MOU, which establishes a term of five years, will serve as an umbrella agreement. Specific activities will be determined on a case-by-case basis and will be conducted under separate agreements that will typically be attachments to the MOU.

A formal plan, coordinated by OGI, will be developed for the creation of the additional basemap layers to be included in ***The Commonwealth Map*** and the maintenance of both current and additional layers. Planning participants, in addition to OGI and USGS, will include GIAC, its committees, subcommittees, work groups, and members, as well as the Kentucky GIS community, including local, state, and federal government representatives. The plan will be documented in a project initiation framework document to be prepared by OGI in compliance with GOT procedures.

A custodian, or custodians, for each layer will be identified and a support group (some now existing, some to be formed) will be constituted. OGI will provide staff support for each group. In addition, technical issues (such as database management and web mapping services) and policy matters (such as cost recovery mechanisms and confidentiality provisions) will be addressed. OGI will also work with GIAC to initiate a public relations campaign to promote program participation and secure political and financial support.

Conclusion

The Commonwealth Map (***figure 3***) is a unifying and organizing concept. It is also a set of products. It is maps, data, and databases. But it is also people and organizations. It is about getting things done more efficiently and effectively. Above all, it is about cooperation and coordination. It will link the various levels of government together and allow business and citizens to make better use of government services and resources. It is a way to bring government to the people and people to the government.

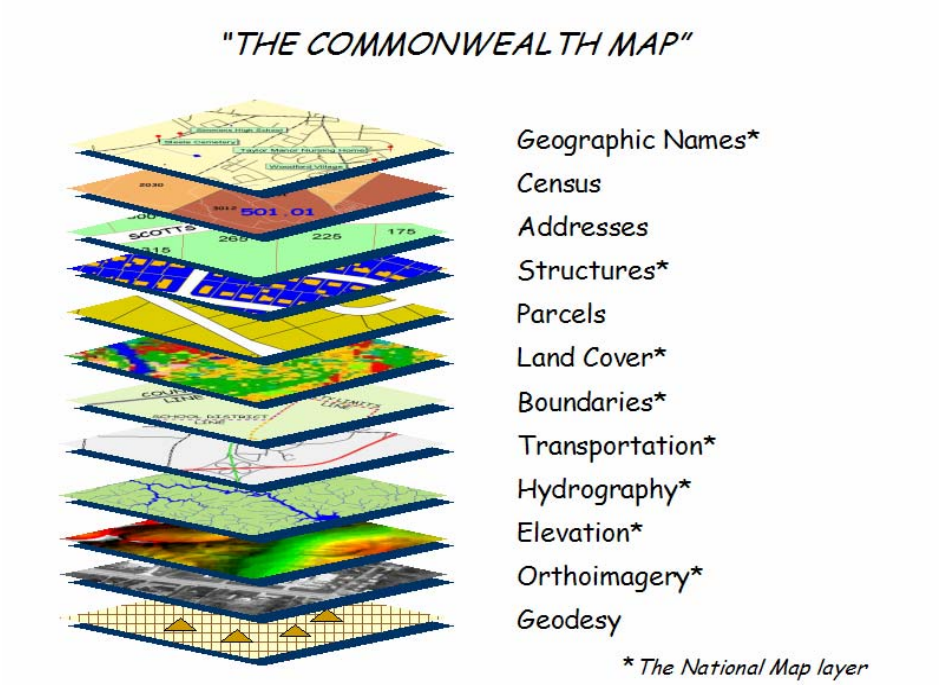

figure 3

APPENDIX A

BASEMAP LAYERS ADOPTED IN 1995

Geodesy

- Horizontal and vertical geodetic control layer ("the transparent layer")
- Common reference system for creation of other basemap layers and thematic data
- Ky Federal Base Network (reobservation and densification of High Accuracy Reference Network--HARN) to be completed 2003
- Geodetic control layer improved and maintained through partnership with National Geodetic Survey (Kentucky has resident NGS advisor)
- Height Modernization Subcommittee of GIAC working with NGS on plan to update vertical control

Orthoimagery*

- Digital Ortho Quarter Quad (DOQQ) statewide coverage
- Black and white orthorectified aerial photography with one meter pixel resolution and horizontal accuracy of approximately ten meters
- Initial coverage (1992-1998 fly dates) acquired through partnership with USGS and USDA
- Oldest imagery (east of 84 degrees longitude--approximately one-fourth of the state) updated in 2001-2002 with state funding
- OGI has requested state funding through Six Year Capital Plan to update imagery west of 84 degrees longitude
- Long-range strategy (with secure funding source) needed for periodic updating and improvement (such as higher resolution in needed areas)

Elevation*

- Digital Elevation Models (DEMs)--cartographic representation of the surface of the earth created through a series of three-dimensional coordinate values
- DEMs used to create contour lines, spot elevations, shading, and other topographic effects as well as being used in the production of DOQQs
- Seamless DEM statewide coverage with 10 meter posting interval completed in 2002 through partnership with USGS (replacing 30 meter posting)

**The National Map layer*

Hydrography*

- National Hydrography Dataset (NHD) completed in 2003
- Unique identifiers for stream segments
- Provides both flow direction and connectivity
- Built on 1:24,000 USGS Digital Line Graphs (DLGs)
- Matched to orthoimagery
- Created through partnership with U.S. Geological Survey (Ky first state in conterminious US completed with current methodology—after Hawaii)

Transportation*

- Road Centerline GPS project being conducted by Ky Transportation Cabinet in partnership with Area Development Districts to be completed in 2004
- Various local governments also doing road centerlines
- Will need rail, water, and air transportation coverages to complete layer

Boundaries*

- Various administrative boundaries
- State, county, city boundaries
- State, regional, and local administrative districts
- Taxing, legislative, utility, and special districts
- Federal and state lands
- GIAC Boundary Subcommittee, with representatives from many agencies, currently working with Ky Infrastructure Authority
- Some boundary coverages complete, some in progress, some not started

**The National Map layer*

APPENDIX B

ADDITIONAL BASEMAP LAYERS

Land Cover*

- Kentucky Landscape Snapshot (KLS) project--NASA grant 2002-2005
- Partnership of GOT, USGS, DNR, USFS, and Space Imaging
- Accurate land cover and land use baseline
- Data for local, state, and federal land use planning
- Covers both natural and urban landscapes
- Creates stratified forest inventory
- Establishes change detection methodology
- Provides tools and training
- Completion of KLS project will provide state with excellent land cover base—need to develop and implement maintenance program

Parcels

- Cadastral layer of property ownership lines and parcel identifiers
- Parcel maintenance done by each county PVA office (assessor)
- Ky Revenue Cabinet provides oversight, guidance, and assistance to PVA offices
- Parcel layer will be widely used
- PVA offices and KRC have digitized parcels in 70 counties, 25 in progress, 21 have been scanned, 2 partially scanned, and only 2 out of 120 counties not started

Structures*

- Residental, commercial, industrial, farm, and public buildings
- Other man-made features such as towers, tanks, docks, and transmission lines
- Some to be indicated by symbology; others by building footprints
- Structure layer will be widely used for diverse applications
- Ky Revenue Cabinet, PVAs, and OGI discussing potential collection and maintenance partnership agreement with USGS

**The National Map layer*

Addresses

- Needed for 911 response, incident mapping, emergency management, public program administration, and business and individual uses
- Commercial Mobile Radio Service Emergency Telecommunications (CMRS) Board requiring all counties to have accurate address range maps to be used for 911 cell phone calls by January 1, 2006
- Pilot project developing and recommending methodology completed
- Ky State Police recently initiated "911 Public Safety Mapping Project" with support from Ky Transportation Cabinet, OGI, and Area Development Districts
- Point addresses available in many counties—statewide coverage will be ultimately needed

Census

- US Census Bureau geographic entities—both statistical and legal/administrative
- Includes census blocks, block groups, tracts, designated places, urbanized areas, metropolitan areas, and others
- Many applications for government, academic, public interest, and private sector users
- Support for spatial research and modeling
- Discussions initiated with Census Bureau and Kentucky State Data Center

Geographic Names*

- Kentucky Geographic Names Information System (KyGNIS)
- Implementation of Phase II of USGS's GNIS program is needed
- Ky one of only four states that have not started Phase II (also New York, Michigan, and Alaska)
- Current GNIS (Phase I) estimated to have only one-quarter of names in state
- Recent proposal submitted to USGS by Ky Geological Survey and Ky Geographic Names Committee not funded—new proposal with additional participants being developed

**The National Map layer*